TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, May 1939, at selected stations*

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Point Barrow	29.99	−0.10	30.22	12	29.54	5
Dutch Harbor	29.94	+.10	30.44	8	29.36	17
St. Paul	29.96	+.12	30.40	8	29.30	17
Kodiak	29.83	−.01	30.30	1	29.54	27
Juneau	29.93	−.06	30.33	10	29.12	28
Tatoosh Island	30.07	+.06	30.32	7	29.73	28
San Francisco	30.00	+.01	30.23	19	29.78	29
Mazatlan	29.85	.00	29.90	16, 20, 21	29.80	4, 8, 24, 29, 31
Honolulu	30.04	−.01	30.15	13	29.88	9
Midway Island	30.09	+.04	30.27	5	29.86	10
Guam	29.86	−.02	29.92	1, 4, 5	29.77	24
Manila	29.78	+.01	29.86	13	29.65	4
Hong Kong	29.75	−.03	29.86	2, 15	29.56	29
Naha	29.85	+.03	30.00	14, 15, 26	29.65	7
Titijima	29.90	−.01	30.09	26	29.65	16, 20
Petropavlosk	29.94	+.11	30.48	9	29.41	14

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

Cyclones and gales of the extratropics.—Despite the number of extratropical cyclones that crossed North Pacific waters during May 1939, none exhibited any great intensity, and the highest winds in the few gales reported for the month were not in excess of force 9. In addition to a number of cyclones that originated in high latitudes and remained in northern waters through most of their existence, there were several this month that had their origin in Japanese waters and close to the northward of Midway Island. Disturbances having the more southerly origin were those in which, as a rule, the stronger winds occurred.

As an instance of this peculiarity, may be mentioned the cyclone of May 1 to 4, which on the lst was central a little northwest of Midway Island and, after pursuing a northeasterly course, arrived in the Gulf of Alaska. The only gales reported in connection with it were of force 8 to 9, on the 2d and 3d, both experienced within the 5° region 35° to 40° N., 180° to 175° E.

On the 9th a further cyclone appeared near Midway Island. Late on that date the British motorship *Silverpalm* ran into a west gale of force 8, barometer 29.41, near 31° N., 170° W., and thereafter continued to experience moderate to fresh gales until the early morning of the 10th. The disturbance took an easterly then a north-northeasterly course and arrived in the Gulf of Alaska on the 13th. During the 11th to 13th gales of force 8 to 9 occurred within the 5° square 45° to 50° N., 150° to 155° W. Early on the 12th the British steamship *Ixion*, near 50° N., 152° W., reported the lowest barometer reading of the month, 28.96 inches, with an accompanying northeast wind of force 7. This was closely followed on ship by a wind of force 9 from the south.

On the 19th a disturbance lay south of central Japan. It took an irregular but generally northward course until the 23d, on which date the center lay east of the Kuril Islands. Thereafter its course was generally easterly to northeasterly until the 28th, when it lay off the coast of extreme southeastern Alaska. The only gales reported as accompanying this disturbance occurred on the 19th to 23d. The storm had its greatest apparent intensity during the night of the 21st-22d, when the Norwegian motorship *Evita* encountered north-northwesterly gales of force 9, lowest barometer 29.30, in the vicinity of 36° N., 144° E.

The only gale reported in the United States coastal waters was experienced by the American steamship *La Placentia* on the 5th, in latitude 41°56′ N., longitude 124°24′ W. A strong oceanic anticyclone was pressing at the time close upon the California coast.

Typhoon.—Subjoined is an account by the Reverend Bernard F. Doucette, S. J., Weather Bureau, Manila, P. I., of the typhoon of April 29 to May 9, 1939, in waters of the Far East. Mail reports from ships caught in this typhoon indicate its greatest intensity to have occurred on the 8th. The British steamship *Lacklan*, noted by Father Doucette as having a south wind of force 9, in 31° N., 136° E., at 1 p. m. of that date, ran into the full force of the storm shortly after 3. p. m. with a north gale of hurricane intensity. The lowest known barometer in connection with the typhoon was 29.06, read on board the Japanese motorship *San Clemente Maru* at 10 p. m. of the 8th, in 32°40′ N., 138°30′ E. It was accompanied by a south gale of force 9, and was followed at 10:20 p. m. by the highest wind at ship, a north gale of force 10.

Fog.—There was but little change in the amount of fog formation along the United States coast since April, but in northwestern Pacific waters, there was a considerable increase, as is usual in May. Within the area 41° to 46° N., 150° to 170° E., fog was reported on 11 days, with 4 to 5 days with fog in each of the included 5° squares. To the southeastward, between 30° and 35° N., 170° and 175° E., there were 3 days with fog. Scattered occurrences were reported to the eastward of mid-ocean, but on not more than 2 days in even the most frequented 5° square. Along the American coast ships reported 2 days with fog off Washington, 3 days with fog off Oregon, and 9 days with fog off California.

TYPHOONS AND DEPRESSIONS OVER THE FAR EAST

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Typhoon, April 29–May 9, 1939.—A low-pressure area appeared central about 300 miles south of Yap on the morning of April 29. It moved west-northwest, then north and north-northwest to the regions close to latitude 9°30′ N., longitude 130° E., where, during the morning hours of May 2, it intensified to depression strength. Moving in a west-northwesterly direction, it reached southern Samar during the afternoon hours of May 3 and continued during the evening and the next day toward Masbate. After it passed Masbate Island, if shifted its course to the north-northeast, then north, thus passing over the Camarines Provinces to the ocean regions east of central Luzon. Its movement on May 5 and 6, in a northerly direction, brought the center to the Balintang Channel. The shifting of the winds at Basco showed that the center moved north-northwest, reaching a position about 60 miles west of Basco, from which location it moved in an east-northeasterly direction, changing to the north when about 100 miles northeast of Basco (May 7, early morning hours). The center then moved to a position about 150 miles east of southern Formosa, where it changed to the northeast, intensifying to typhoon strength and moving more rapidly. On May 9, the center was located close to the coast line of central Japan, perhaps about 100 miles southeast of Tokyo. The afternoon hours showed the storm weakening as it moved along a northeasterly course away from Japan.

From May 2 to 6, a typhoon situation prevailed over the Philippines. On May 3 to 5, when the center was over the Visayan Islands, the lowest pressures reported

varied between 751 and 752 mm. (29.567 and 29.606 inches), with winds from force 1 to 3. The strongest winds reported were at a distance from the center, and very likely due to local effects. Legaspi and Sorsogon had northeast winds, force 5 and 6, when the center was near Samar Island. Cebu and Tacloban reported south-quadrant winds, force 5 and 6, when the center was approaching or passing over the Camarines Provinces. As the center moved northward, close to the eastern coast of Luzon and approached the Balintang Channel, pressure values reported from Vigan and Laoag seemed to indicate that the center was about to move northwest or even west into the China Sea. The high pressure values at the Loochoo (Nansei) Island stations helped in giving the impression that the storm would take such a course, but on the afternoon of May 6, these stations reported lower pressure values as the HIGH over the ocean began to move eastward. This change in the situation allowed the storm center to take its northeasterly course.

Manila newspapers printed a dispatch, dated May 6, from Basco, Batanes Islands, that 90 fishermen were caught by the strong winds over the regions east of those islands. One man was drowned and eleven missing. The U. S. S. *Trinity* was traveling southward and reported from latitude 20.3° N., longitude 124.1° east, winds of force 9, squally weather, and pressure of 753.1 mm. (29.650 inches), May 6, 6 p. m. This was at the period when the center was over the eastern part of the Balintang Channel and shifting to the north-northwest.

From May 7 to 9, as the storm moved from the Bashi Channel and locality to Japan, it manifested its power on the surface much more than when it was over the Philippine Archipelago. Oshima, May 8, 5 a. m. (Manila time), had north-northeast winds and 749.5 mm. (29.508 inches) as pressure; Borodino reported west-southwest winds, force 5, and pressure of 749.2 mm. (29.496 inches), while Naha had north winds, force 5, with pressure at 753.0 mm. (29.646 inches). On May 8, 1 p. m., the S. S. *Lacklan* reported from latitude 31.0 N., longitude 136.0 E., a value of 739.5 mm. (29.114 inches) for pressure, with winds of force 9 from the south.

During the last 10 days of April, there was a weak east-quadrant air stream north of the Equator and another mild current from the west quadrant south of the Equator, the front separating these air currents extending east to west, parallel to and a short distance north of the Equator. All of the available pilots from the Netherlands East Indies showed that this weak westerly current was not extensive, for Koepang, Timor Island, reported easterly winds during this period. On April 29 the velocities of the upper winds over Guam increased to values as high as 50 k. p. h. and then decreased during the next few days. This impulse reached Cebu, changing the direction from the southeast quadrant to the northeast, May 1 and 2, and increasing the velocities to values as high as 50 and 60 k. p. h. From April 30 to May 2 northeasterly winds appeared over Manila, the velocities increasing just when those at Cebu were decreasing. At the same time, Palau had a cloud movement from the south with rising pressure. As the center approached and crossed Samar into the Visayan Islands, May 2 to 6, the directions over Cebu, Zamboanga, Menado, and Tarakan shifted to the southwest quadrant. Of the pilots received from Menado, the highest velocities occurred on the afternoon of May 3, values of 50 k. p. h. being attained, while the other stations (except Makassar) of the Netherlands East Indies seldom had winds stronger than 20 k. p. h. (as far as can be ascertained from the available data). It seems that the velocities increased as though the action was caused by the storm center and not due to action far away from the disturbance. After the center had crossed the Camarines Provinces and was moving northward, only short ascents were possible at Manila due to low clouds and rain. Easterly winds at Manila did not reach values of 50 k. p. h. but the southwest quadrant winds, flowing toward the disturbance as it approached the Balintang Channel, reached values as high as 50 k. p. h. on a few ascents. At Aparri, however, the easterly winds, which attained velocities as high as 55 k. p. h., did not go above 45 k. p. h. after the directions shifted to the north and northwest and finally to the southwest quadrant. The upper winds indicated the existence of a definite, but not violent, circulation as the disturbance moved over the Archipelago and adjacent regions.